IC30 Series Service Manual

Product Description
Set-Up/Test Procedures
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PCB Overlays

Australian Monitor. Private Bag 149 Silverwater NSW 1811. Australia

IC30
Circuit Description

The IC30 is a 30 watt mixer amplifier which operates on 230/240 VAC, 50Hz or 12 VDC via an external DC power supply source. The amplifier is supplied free standing with rubber feet but can be rack mounted via an optional rack mount kit (IC30RMK). The IC30 will deliver 30 watts into a load of 4 ohms, 70 volt or 100 volt line. The IC30 may be stacked to a maximum of four units high. An IEC type mains cord and receptacle are provided, the receptacle also houses the mains fuse in a drawer which pulls open to expose the fuse. A single spare fuse is also located in this drawer.

AC Power Inlet

The 3 pin IEC power inlet is located on the bottom left of the rear panel and accepts a standard mains power lead fitted with an IEC connector. Before plugging in a power lead, please check the rear panel of the amplifier to ensure that the voltage switch is set correctly for your part of the world.

The operating voltage is 230/240 VAC @ 50 Hz. The inlet is equipped with an inbuilt AC fuse holder fitted with a 1 amp plus a spare within the holder].

Power consumption is approximately 60 VA.

12 Volt DC Operation

The IC30 features optional 12VDC power to run off a battery supply if required. This is connected via the rear terminal strip. The front panel Power Switch will not switch DC power 'on' or 'off' in DC operation. In this mode the amplifier is always 'on'. When running from 12 VDC power, the LED will not illuminate.

There is no trickle charge resistor across the diode.

230V/240V Slide Switch

The operating voltage of the amplifier is user selectable between 230V and 240V via a slide switch located on the top left side of the rear panel. This switch should be set to match the AC voltage of your country. The mains transformer is wound with a 230V winding plus a 10V winding internally connected.

Power Amp

The IC30 uses two(2) Philips amplifier ICs (TDA1516) with built in current overload and thermal protection. The two amplifier modules are capacitively coupled to the two primary windings of the output transformer in parallel (not in bridge).

Speaker Output Terminal Strip

The screw terminals in the middle of the strip allow access to the direct speaker outputs of the amplifier. Reading from left to right the terminals are:

COM	Common or "-" for low impedance speaker loads (4 or 8 ohms).
4	Positive "+" for 4 ohm speaker loads (use with common)
COM	Common or "-" for 70v or100v speaker loads (maximum load of 80 ohms at 100v)
70	Positive "+" for 70v line speaker loads (use with common)
100	Positive "+" for 100v line speaker loads (use with common)

Please ensure that the correct "Common" is used. Low impedance and 70/100v loads can be used simultaneously but please pay careful attention to the overall speaker load.
Note: The minimum impedance (or maximum load) at 100 volt line should be no less than 80 Ohms

Muting
The last two(2) terminals on the barrier strip are for muting. Channels 2 and 3 are muted when the two mute contacts are shorted together. The muting is done by a FET switch so there is no ramping. An optional VOX muting module (TX3010) is also available with has ramping.

Phantom Power
The IC30 does not have phantom power on the XLR's.

Tape Output

A mono RCA output connector provides a line level output with a maximum of 350mV into 10k Ohms. Signal from all three input channels are fed to the tape output. Level adjustments made to the three input channels will affect the level going to the tape output.

Microphone/Line Inputs
Three universal microphone/line inputs are provided. Microphone inputs are via the 3 pin XLR connectors while line inputs are via the RCA style connectors (one of each is provided per channel). All three inputs can be used for microphone and auxiliary input sources. It is also possible to connect both a microphone and line/aux source to the one channel simultaneously however their relative levels to one another will be fixed, as there is only one gain control per channel.
The XLR connectors are wired: Pin 1: Earth. Pin 2: Active (high, +), Pin 3: Active (low, -). Microphone input sensitivity is 1.5mV at 200 ohms.
The RCA connectors have an input sensitivity of 80mV at 47K ohms.

Microphone Inputs
All three(3) inputs are dual mic/line with microphone inputs being via a 3 pin XLR connector per channel. The mic input sensitivity is 1.5mV @ 200 ohms. Pin connections are: pin 1-earth; pin 2-signal (hot +); pin 3-signal (cold -). Phantom power is not available. Reading from left to right across the rear panel, the inputs are 3, 2, & 1.

Line Inputs
All three(3) inputs are dual mic/line with line/auxiliary inputs being via mono RCA connectors per channel. Line input sensitivity is 75mV @ 47K ohms. Reading from left to right across the rear panel, the inputs are 3, 2, & 1.

Optional Accessories

Tone Generators
Four separate tones are available as an optional plug in card (ATC5488). The ATC5488 is a small circuit board which simply plugs into a socket inside the amplifier. Activation is via contact closures which may be wired to the rear panel of the IC30 or to external switches or a timer. Full installation instructions are provided with the tone generator.
Tones available on the ATC5488 tone generator board are:
Evacuation Tone (to Australian Standard AS2220.1.2)
Alert Tone (to Australian Standard AS2220.1.2)
Bell TonePre Announce Chime

VOX Muting Module
An optional VOX muting module (TX3010) is available. When installed inside the amplifier, signal on channel 1 of the amplifier will automatcially mute channels 2 and 3. When there is no signal on channel 1, channels 2 and 3 will operate normally. Full installation instructions are provided with the TX3010.

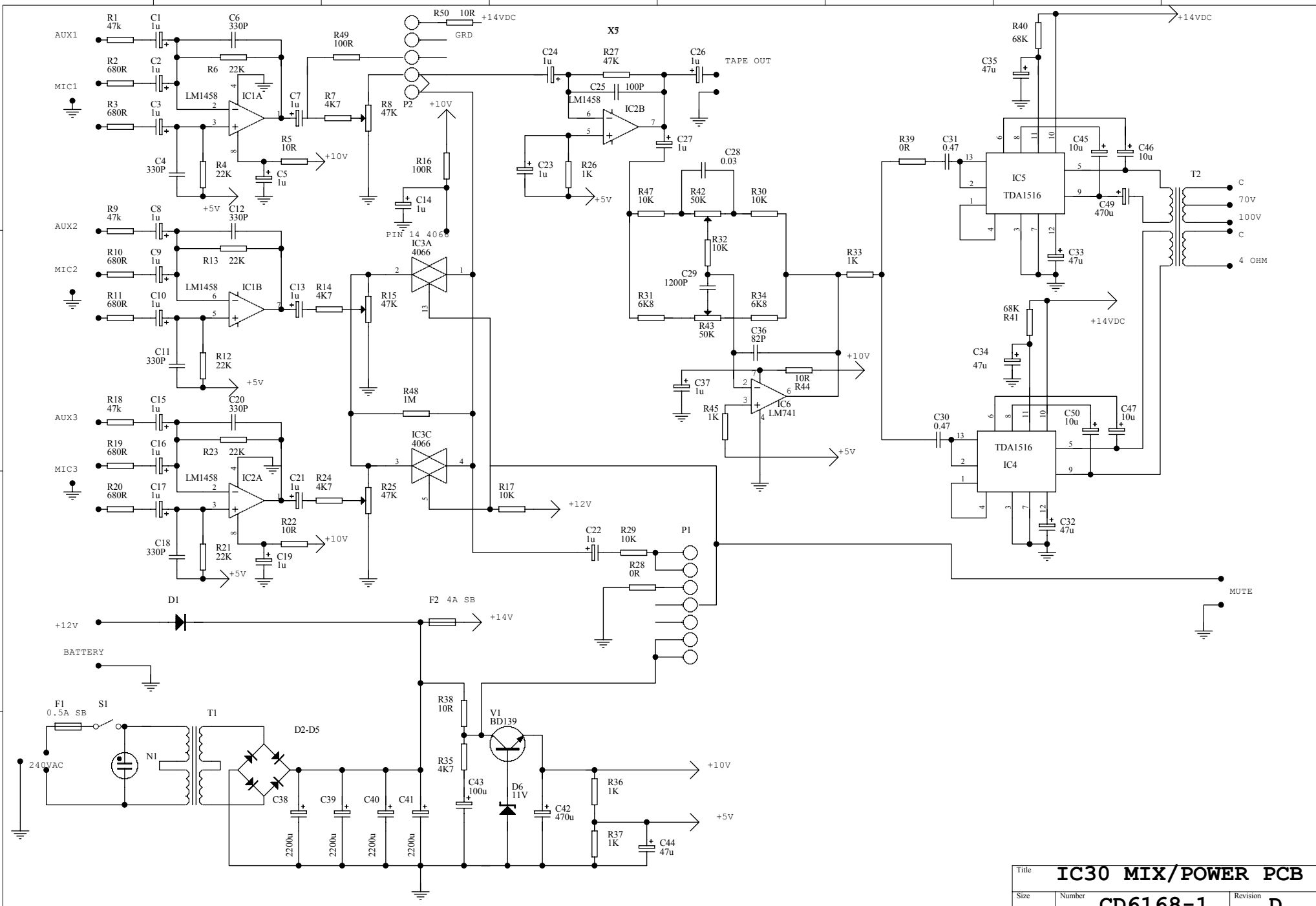
Rack Mouting Kit

An optional rack mounting kit (IC30RMK) is available to mount the IC30 in a standard 19" equipment rack.

Fuse Sizes

Mains 230 VAC: 1 Amperes Slow Blow

The DC fuse is located on the circuit board. This is a feature of the AMIS series amplifiers, which are equipped with a current limiting circuit preventing excessive DC currents, thus eliminating the risk of blowing high tension fuses. In the unlikely event that the DC fuse actuates, the output IC modules should be checked, as it is probable that the amplifier has been subjected to very extreme conditions. The DC fuses are 4A time lag fuses.



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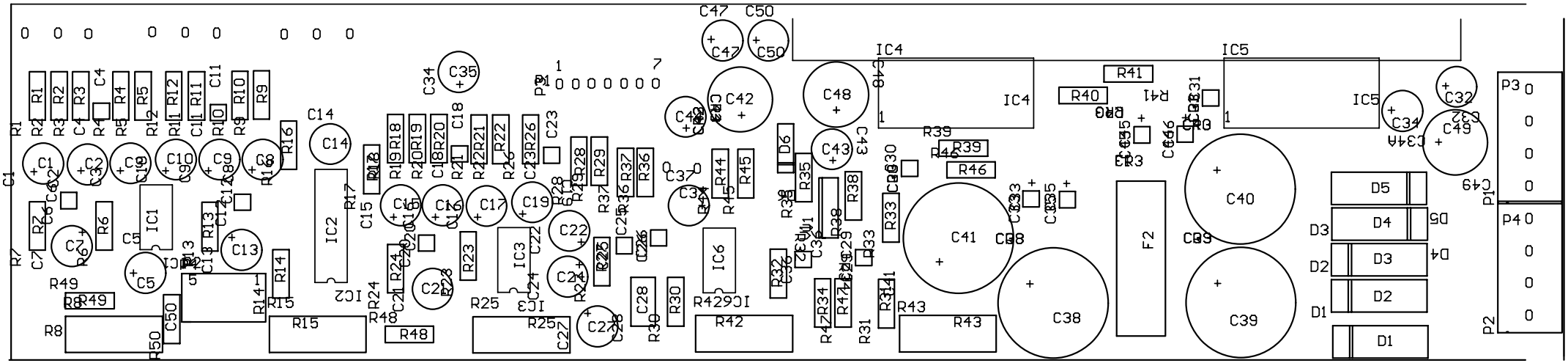
IC1
IC2
IC3
IC4
IC5
IC6
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
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R46
R47
R48
R49
D1
D2
D3
D4
D5
D6
F2
P1
P2
P3
P4

IC30 Parts List			
Designator	**Part Type**	**Description**	**Manufacturer's Code**
C1	1u	Electrolytic capacitor 63V	2121280010
C10	1u	Electrolytic capacitor 63V	2121280010
C11	330P	Multi layer ceramic capacitor 100V	2127181331
C12	330P	Multi layer ceramic capacitor 100V	2127181331
C13	1u	Electrolytic capacitor 63V	2121280010
C14	1u	Electrolytic capacitor 63V	2121280010
C15	1u	Electrolytic capacitor 63V	2121280010
C16	1u	Electrolytic capacitor 63V	2121280010
C17	1u	Electrolytic capacitor 63V	2121280010
C18	330P	Multi layer ceramic capacitor 100V	2127181331
C19	1u	Electrolytic capacitor 63V	2121280010
C2	1u	Electrolytic capacitor 63V	2121280010
C20	330P	Multi layer ceramic capacitor 100V	2127181331
C21	1u	Electrolytic capacitor 63V	2121280010
C22	1u	Electrolytic capacitor 63V	2121280010
C23	1u	Electrolytic capacitor 63V	2121280010
C24	1u	Electrolytic capacitor 63V	2121280010
C25	100P	Multi layer ceramic capacitor 100V	2127181101
C26	1u	Electrolytic capacitor 63V	2121280010
C27	1u	Electrolytic capacitor 63V	2121280010
C28	0.03	Multi layer ceramic capacitor 100V	2124292330
C29	1200P	Multi layer ceramic capacitor 100V	2127181122
C3	1u	Electrolytic capacitor 63V	2121280010
C30	0.47	Metalised Poly Capacitor	2124262472
C31	0.47	Electrolytic capacitor 63V	2124262472
C32	47u	Electrolytic capacitor 35V	2121230470
C33	47u	Electrolytic capacitor 35V	2121230470
C34	47u	Electrolytic capacitor 35V	2121230470
C35	47u	Electrolytic capacitor 35V	2121230470
C36	82P	Multi layer ceramic capacitor 100V	2127181820
C37	1u	Electrolytic capacitor 63V	2121280010
C38	2200u	Electrolytic capacitor 35V	2121220222
C39	2200u	Electrolytic capacitor 35V	2121220222
C4	330P	Multi layer ceramic capacitor 100V	2127181331
C40	2200u	Electrolytic capacitor 35V	2121220222
C41	2200u	Electrolytic capacitor 35V	2121220222
C42	470u	Electrolytic capacitor 35V	2121230471
C43	100u	Electrolytic capacitor 100V	2121220101
C44	47u	Electrolytic capacitor 35V	2121230470
C45	10u	Electrolytic capacitor 50V	2121250100
C46	10u	Electrolytic capacitor 50V	2121250100
C47	10u	Electrolytic capacitor 50V	2121250100
C49	470u	Electrolytic capacitor 35V	2121230471
C5	1u	Electrolytic capacitor 63V	2121280010
C50	10u	Electrolytic capacitor 50V	2121250100
C6	330P	Multi layer ceramic capacitor 100V	2127181331
C7	1u	Electrolytic capacitor 63V	2121280010
C8	1u	Electrolytic capacitor 63V	2121280010
C9	1u	Electrolytic capacitor 63V	2121280010
D1		Diode 1N5408	2133450408
D2-D5		Diode 1N5408	2133450408
D6	12V	Zener Diode 1W 12V 1N4742	2136010120
F1	.5A	0.5 Amp Anti-surge Fuse	2543210059

F2	4.0A	4.0 Amp Anti-surge Fuse	2541210840
IC1	LM1458	IC Dual Op Amp DIP8	2152870558
IC2	LM1458	IC Dual Op Amp DIP8	2152870558
IC3	4066	I.C. CD 4066BCN VCA (14 PIN)	2159440066
IC4	TDA1516	Amplifier IC TDA1516BQ	2153121516
IC5	TDA1516	Amplifier IC TDA1516BQ	2153121516
IC6	LM741	LM741 IC	2152080741
P1	X7	Transistor BD139	2141400139
P2	X5	Transistor BD139	2141400139
R1	47k	Resistor, metalfilm .5W	9111590473
R10	680R	Resistor, metalfilm .5W	9111590681
R11	680R	Resistor, metalfilm .5W	9111590681
R12	22K	Resistor, metalfilm .5W	9111590223
R13	22K	Resistor, metalfilm .5W	9111590223
R14	4K7	Resistor, metalfilm .5W	9111590472
R15	50K	Potentiometer linear	2021000503
R16	100R	Resistor, metalfilm .5W	9111590101
R17	10K	Resistor, metalfilm .5W	9111590103
R18	47k	Resistor, metalfilm .5W	9111590473
R19	680R	Resistor, metalfilm .5W	9111590681
R2	680R	Resistor, metalfilm .5W	9111590681
R20	680R	Resistor, metalfilm .5W	9111590681
R21	22K	Resistor, metalfilm .5W	9111590223
R22	10R	Resistor, metalfilm .5W	9111590100
R23	22K	Resistor, metalfilm .5W	9111590223
R24	4K7	Resistor, metalfilm .5W	9111590472
R25	50K	Potentiometer linear	2021000503
R26	1K	Resistor, metalfilm .5W	9111590102
R27	47K	Resistor, metalfilm .5W	9111590473
R28	0R	Resistor, metalfilm .5W	9111590000
R29	10K	Resistor, metalfilm .5W	9111590103
R3	680R	Resistor, metalfilm .5W	9111590681
R30	10K	Resistor, metalfilm .5W	9111590103
R31	6K8	Resistor, metalfilm .5W	9111590682
R32	10K	Resistor, metalfilm .5W	9111590103
R33	1K	Resistor, metalfilm .5W	9111590102
R34	6K8	Resistor, metalfilm .5W	9111590682
R35	4K7	Resistor, metalfilm .5W	9111590472
R36	1K	Resistor, metalfilm .5W	9111590102
R37	1K	Resistor, metalfilm .5W	9111590102
R38	10R	Resistor, metalfilm .5W	9111590100
R39	0R	Resistor, metalfilm .5W	9111590000
R4	22K	Resistor, metalfilm .5W	9111590223
R40	68K	Resistor, metalfilm .5W	9111590683
R41	68K	Resistor, metalfilm .5W	9111590683
R42	50K	Potentiometer linear	2021000503
R43	50K	Resistor, metalfilm .5W	2021000503
R44	10R	Resistor, metalfilm .5W	9111590100
R45	1K	Resistor, metalfilm .5W	9111590102
R47	10K	Resistor, metalfilm .5W	9111590103
R48	1M	Resistor, metalfilm .5W	9111590104
R49	100R	Resistor, metalfilm .5W	9111590101
R5	10R	Resistor, metalfilm .5W	9111590100
R50	10R	Resistor, metalfilm .5W	9111590100
R6	22K	Resistor, metalfilm .5W	9111590223

R7	4K7	Resistor, metalfilm .5W	9111590472
R8	50K	Potentiometer linear	2021000503
R9	47k	Resistor, metalfilm .5W	9111590473
S1		Rocker switch SPST	2511213112

WORK INSTRUCTION

Testing of IC 30

1. Perform physical inspection (Visual Inspection stage)
   1.1 Check :
   - All screws for tightness (esp. H/S & IC fixing).
   - Capacitors for polarity.
   - Earth connection for good contact (XLR gnd to AC earth), including earthing of RCA's,
   - All wiring points for good contacts (Soldering and Crimping)

2. Set up amplifier for test (Pre (PCB testing)).

   2.1 Connect amplifier to :
   - Variac (0 Vac)
   - Signal generator (Mic 1, no signal),
   - Resistive load (4ohm on 4ohm output).

   2.2 Reset controls :
   - Volume controls to minimum,
   - Bass/treble control to center,
   - Phantom power switch to off,

3. Power up (Pre (PCB testing).
   3.1 Turn on power switch and adjust voltage to 120VAC. Watch current meter for excess current draw.
   3.2 Check DC power supply at fuse. Should be approximately. 7V ($\pm$ 1V)
   3.3 Check DC voltage on mixer board. Should be approximately. 6V (Check on 8 No. Pin of 1458).
   3.4 Adjust variac to 240VAC. Check DC power supply. Should be approx. 15V ($\pm$ 1V) loaded, no load (16.5V $\pm$ 1V).
   3.5 Check DC voltage on mixer board. Should be approx. (11V $\pm$ 1V).

4. AC Check (Final stage).
   4.1 Set signal generator to (1mV) $\pm$ 0.2mV. Turn up Mic1 volume control to full. Watch for irregularities with output. Check sensitivity of input. – MIC 1mV ($\pm$ 0.2mV) in 10.5Vrms out (2.6% THD).
   4.2 Measure 100V line, 70V line, tol. 5%
   4.3 Check tape output (0.4V $\pm$ 100mV).
   4.4 Check Bass control @100HZ = $\pm$ 12dB (can get only upto 8V O/P with total swing of (20 – 24dB)) and treble @10KHz = $\pm$ 10dB (tolerance. 10%) total swing (18 – 22dB).

5. Function Checks (Final stage).

    5.1 Move signal generator to Mic2. Turn up volume control. Watch for irregularities. Check for 10.5V out.
    5.2 Move signal generator to Mic3. Turn up volume control. Watch for irregularities. Check for 10.5V out.

6. Line level inputs (Final stage).
    6.1 Connect signal generator to Line1 input. Check input sensitivity – LINE (85mV $\pm$ 20mV) in 10.5V out.
    6.2 Move signal generator to Line2 input. Check 10.5V out.
    6.3 Move signal generator to Line3 input. Check 10.5V out.
    6.4 Check muting function by shorting mute terminals on rear barrier strip.
    6.5 Check operation of (230 – 240)V selector switch for full wattage in each position of switch.
    6.6 Frequency Response – Check the frequency response and power bandwidth of 1st set of every new batch of production.
    Frequency Response – (250Hz – 10kHz).
    Power band – (250Hz – 6.5kHz).

7. Finishing up (Final stage).
    7.1 Short output and check that signal cuts out and returns after short is removed.
    7.2 Remove input signal and check for Hum and Noise (<20m Vrms)
    7.3 Connect 12V DC to rear barrier strip, turn off power switch. Check signal remains.
    7.4 Reset volumes to minimum.
    7.5 Disconnect from test bench and inspect for scratches on external paint.

8. Burn In.
    8.1 Leave units on (with lid) for 24 hrs.

9. Sound Test (Check Fuse Ratings).
    9.1 Adjust tone controls to minimum. and maximum listening for scratches and irregularities. Similarly for each level control with MASTER full.
    9.2 Connect CD player to Line4 and bring up channel and master volumes.
    9.3 Listen for irregularities.
    9.4 Check priority of (MIC1 and MIC2) over all other channels.
    9.5 Check all the tones.

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   3.3 Check DC voltage on mixer board. Should be approximately. 6V (Check on 8 No. Pin of 1458).
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   4.2 Measure 100V line, 70V line, tol. 5%
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5. Function Checks (Final stage).

    5.1 Move signal generator to Mic2. Turn up volume control. Watch for irregularities. Check for 10.5V out.
    5.2 Move signal generator to Mic3. Turn up volume control. Watch for irregularities. Check for 10.5V out.

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    6.1 Connect signal generator to Line1 input. Check input sensitivity – LINE (85mV $\pm$ 20mV) in 10.5V out.
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    9.2 Connect CD player to Line4 and bring up channel and master volumes.
    9.3 Listen for irregularities.
    9.4 Check priority of (MIC1 and MIC2) over all other channels.
    9.5 Check all the tones.